MORE SUGGESTIONS FOR COUNTY COUNCILS.

County Councils and Technical Education. By J. C. Buckmaster. (London: Blackie and Sons.)

UNDER the above title Mr. Buckmaster, who for many years has been connected as teacher, lecturer, and organizer with the Science and Art Department, gives some statistics relating to technical education, and his views on the best way of utilizing the funds in the hands of County Councils. We need hardly say that, backed as they are by so long an experience, his opinions deserve the most careful and respectful consideration.

Briefly stated, Mr. Buckmaster believes in class teaching as opposed to lectures, and in utilizing as far as possible existing elementary and science and art teachers. "Unless," he says, "the sympathy of teachers and other educationists can be enlisted, the most carefully considered schemes of County Councils can only end in partial or complete failure." Again,

> "Lectures by themselves are never to be highly valued as a means of education. In a lecture on science, to create and sustain an interest, you must be popular, and to do this you avoid the complex difficulties of the science, which are often the only intellectual parts of it. . . . Lectures, unless followed up by thought and reading on the part of those who hear them, fail as a means of education, &c., &c."

All this is excellent, and the warning is useful. But when Mr. Buckmaster comes to the application of these principles he is not quite so happy. For example, he is unjust to the University Extension system, which he does not clearly understand, and treats as though it were mere popular lecturing, like the work of the old Mechanics' Institutes. Now, though we have no belief that the University Extension machinery can fill the place of elementary class teaching, we cannot accept the implied suggestion that courses of ten or twelve lectures (often arranged in sequences of two or three sets of twelve lectures), each lecture followed by a class for the more serious students, and by written paper work corrected by the lecturer, and the whole course tested by independent examination, form an engine of instruction scarcely above the level of a clever conjuror's performance.

His constructive suggestions are, first, to use elementary teachers to give object-lessons in simple science—a most useful proposal, about to be carried out in various counties as soon as the teachers themselves can be properly trained for the work; and secondly, to multiply science and art classes. "The best technical instruction for some time will be a wider development and extension of the educational work of the Science and Art Department by means of night classes and continuation science and art schools." This depends, of course, on the meaning to be attached to "development." If it merely means multiplication, the statement is open to serious question. No one can know better than Mr. Buckmaster the special dangers attaching to the system which he advocates—the abuses which grow up round a system which makes the financial success of the class, and usually the salary of the teacher, depend on the result of an examination. In our opinion, the machinery of the Science and Art Department will long continue to be a most useful and important factor (though not to the exclusion of other agencies) in the development of technical instruction. But the present is the great chance to consolidate and improve, rather than merely extend the work. If the County Council funds are so granted as to correct the evils which inevitably arise out of such a system of payments on results as is adopted by the Department—if its control is used to render more effective the *inspection* as opposed to the mere examination of science and art classes—then the portion of the grant given to promote the work aided by the Science and Art Department will be well spent. But no claim on the part of this or any other single agency to a monopoly of all technical instruction above the rank of that which can be given by the village teacher can be conceded. Mr. Buckmaster does not in so many words make the claim, but he sometimes seems to imply it by minimizing the value of most other experiments which County Councils are attempting. It is virtually a plea for educational bureaucracy against local experiment. But we have not yet reached the stage, if, indeed, we ever do so, when variety of experiment can be dispensed with. Some of the experiments will probably fail. But it is only by wide and free experimenting that the "fittest" will be discovered. Mr. Buckmaster has confined himself, probably on purpose, to the elementary branches of technical instruction, and is silent on its higher developments. Manual work he only just mentions, and not with much sympathy. His criticisms on the wood-carving taught by ladies in villages is not, perhaps, too severe; but it is strange that he does not give a hint that systematic manual training may be (as it has been for a long time in other countries, and lately in our own) made of real educational value. Not a word is said of the worst defect of all in our educational system—the want of good, cheap, secondary schools, which the present grant may do so much to remedy.

Though, however, Mr. Buckmaster takes a rather cramped and narrow view of the outlook, his pamphlet is full of valuable, if rather partial, ideas.

The pamphlet opens and concludes with some useful statistical and other information taken from various publications of the National Association for the Promotion of Technical and Secondary Education. Readers who do not know the source from which these pages are derived may be puzzled by a reference to "the Committee" (p. 41), which by some error in editing has been left still standing, without explanation, in Mr. Buckmaster's pamphlet.

THE MISSOURI BOTANICAL GARDEN.

Missouri Botanical Garden: Second Annual Report. By William Trelease. Pp. 188; Plates 48, reproduced Photographs 5, and Plan of Garden. (St. Louis, Missouri: Published by the Board of Trustees, 1891.)

THE Board of Trustees of the Missouri Botanical Garden have instructed the Director to edit for publication each year a volume setting forth the objects of the Garden and the School of Botany, and the results accomplished by each. The first volume of this series was issued in December 1890, and contained an account

© 1891 Nature Publishing Group

of the Garden and School. The present volume, therefore, really begins the series of annual reports, and together with the reports we have a revision of the North American species of *Epilobium*. In the earlier part of the book details are given of the appointment of six garden pupils to scholarships in accordance with a resolution adopted by the trustees at a meeting held in November 1889. Each scholarship conferred may be held by the recipient for a period not exceeding six years, subject to certain conditions. The holders of scholarships are repaid for their services to the Garden, and at the expiration of the six years are entitled to examination by the Garden Committee. On passing such examination to the satisfaction of the Committee and Director, they receive a certificate of proficiency in the theory and practice of gardening. The only scientific paper in the volume is, as we have just mentioned, a revision of the genus *Epilobium*, the American species occurring north of Mexico being those studied. This genus differs from all the other capsule-bearing *Onagraceæ*, except the Californian *Zauschneria*, in having its seeds provided with an ample coma at the apex. While it reaches great development in New Zealand, *Epilobium* is essentially a genus of temperate and cold climates, and the most widely distributed species are those of Arctic and Alpine regions. In Alaska a few such species occur, which are otherwise confined to the adjacent part of Asia. More widely distributed Arctic-Alpine immigrants from the Old World to the New are *E. spicatum*, *E. latifolium*, *E. palustre*, *E. alpinum*, &c. *E. hirsutum*, *E. parviflorum*, and *E. adnatum*, also occur as accidental waifs. The genus passes into South America along the backbone of the continent; few members of this family extend very far across the Mexican boundary in either direction. The most interesting biological features of the genus are those connected with the means of vegetative propagation, pollination, and dissemination. The contrivances by which species survive the winter, and are vegetatively propagated, in this respect attain an extreme degree of differentiation, one in particular having acquired aërial bulblets. The large-flowered species appear to be regularly proterandrous, the duration of the dichogamy being brief in most of them, and the smaller-flowered seem to be always synacmic and self-fertile, although with the probability of frequent intercrossing by aid of insects attracted by the nectar which is secreted within the calyx tube. The genus is of no striking economic value. The North American Epilobia have been mostly described by De Candolle, Torrey and Gray, Haussknecht and Barbey; the more notable works of more limited range being Hooker's "Flora Boreali-Americana," and Brewer, Watson, and Gray's "Botany of California." Prof. Trelease in his revision enumerates 38 species, which number includes the following novelties: *E. holosericeum*, *E. delicatulum*, and *E. clavatum*. The well-known sections *Chamænerion* and *Lysimachion* are still adhered to, the latter, of course, being by far the larger. In the analytical key the main divisions depend on whether the stigma is deeply 4-lobed or 4-cleft, or entire or only notched. Subdivisions are founded on whether the seeds are smooth, or papillately roughened. The name *E. spicatum*, Lam., is used instead of *angustifolium*, the typical *angustifolium* of Linnæus being, according to Prof. Haussknecht, what is commonly known as *E. Dodonæi*, Vill. We are glad to see that Prof. Trelease differs from Prof. Haussknecht in not adopting a new name for what is left of the original *E. alpinum* The *E. alpinum* of Linnæus included with this *E. Hornemanni* and *E. anagallidifolium*, but we think that the name may well stand for one of the segregates. The genus *Epilobium* has always proved a difficult subject; and Prof. Trelease is to be congratulated on his careful treatment, and successful arrangement, of the North American members. The 48 plates will be found of great help to students of these plants; they are not quite of uniform merit, but, taken as a whole, they give the essential details, stress being laid on the varied form of the stigma and seed. Additional illustrations are some well-reproduced photographs taken in the Garden, and a plan of the grounds (scale $\frac{1}{720}$) in five sections.

E. G. B.

OUR BOOK SHELF.

The Story of the Heavens. By Sir Robert Stawell Ball. Eighteenth Thousand. (London: Cassell and Company, 1891.)

IN the preface to this edition, Sir Robert Ball remarks that he has taken the opportunity to "revise the work in accordance with the progress of astronomy during the last four years," and, generally speaking, new facts and theories are briefly referred to. A few points, however, are hardly brought up to date. For example, the spectrum of the Andromeda nebula is said to be "a faint continuous band of light" (p. 462), although it is now definitely known that this continuity does not exist. We also find no reference to the many stars now known to have bright lines in their spectra. The author thus misses a chance of exercising his well-known descriptive ability in an account of the connection between such stars and nebulæ; the similarity of the two being so considerable that Pickering has followed Lockyer in arranging them in a single group. Dr. Huggins's old view as to the coincidence of the nebula line with nitrogen is mentioned merely to be dismissed as erroneous. Why, therefore, is no notice taken of the suggested magnesium origin of the line—for, on any published evidence, the edge of the magnesium fluting is nearer the proper position than the nitrogen double? We would also point out that, according to recent observations, the apex of the sun's way is much nearer Lyra than Hercules. Telescopic changes in comets are fully described, but the accompanying changes in their spectra are not touched upon. Motions of stars in the line of sight are considered; but not those of nebulæ, although Mr. Keeler's observations have been published for some time. In fact, it may be said that there is a tendency to eschew spectroscopic questions, and hence much of the most beautiful part of the story of the heavens is left untold.

Notes on Elementary Physiography. By Horace C. Martin. (London and Manchester: John Heywood, 1891.)

THE author has collected a lot of scraps of information from standard writers on physiographical matters, and has strung his gleanings together to form this book. And if he were an adept at compilation, and knew how to best arrange and connect facts, this plan of printing extracts *verbatim* might be commended. But when Mr. Martin selects notes which by themselves are incorrect, and inter-

© 1891 Nature Publishing Group